

**Commonwealth of Kentucky**  
**Division for Air Quality**  
***PERMIT STATEMENT OF BASIS***

CONDITIONAL MAJOR (DRAFT PERMIT) No. F-05-040

ESTRON CHEMICAL, INC.

CALVERT CITY, KY 42029

JUNE 21, 2006

RALPH GOSNEY, P.E., REVIEWER

SOURCE I.D.: 21-157-00015

SOURCE A.I. #: 2934

ACTIVITY #: APE20040001

**SOURCE DESCRIPTION:**

An application for an initial source-wide Conditional Major operating permit for Estron Chemical, Inc. (Estron) for the operation of polymer resins manufacturing facility, located in Calvert City, Kentucky, was received by the Division on October 4, 2005.

Estron is currently operating under permit S-97-086, which was issued under former regulation 401 KAR 50:031. The current air permit serves to limit Estron's emissions to less than major source levels for criteria pollutants. Permit S-97-086 expired on December 15, 2000, and Estron originally submitted a permit renewal application on June 20, 2001 followed by updated information on October 4, 2005.

The Standard Industrial Classification (SIC) Code for this source is 2869, *Industrial Organic Chemicals, Not Elsewhere Classified*. This facility consists of following equipment/processes used in manufacturing of polymer resins for the coating industry.

- Boilers and heaters
- Batch reactors consisting of condensers
- Product storage tanks
- Grinders, blenders, mixers and extruder
- Miscellaneous piping, valves, etc.

This permit also corrects a permit formatting error from Permit S-97-086, which listed products (resins) as individual emission points. However, the reactor trains are the actual emission units, and not the products produced in the reactor trains. Therefore, the emission points for all the equipment/processes except the boilers have been changed from what was listed in Permit S-97-086.

Estron has requested voluntary permit conditions to limit the facility's potential to emit (PTE) regulated air pollutants below major source thresholds. Therefore, the source is subject to the provision of 401 KAR 52:030, *Federally Enforceable Permits for Nonmajor Sources*. This permit is the initial Conditional Major operating permit for this source.

**MINOR PERMIT REVISION FOR installation of new storage tanks (APE20060001):**

Estron applied for a minor revision to:

- Install two new tanks, Tank 151 (EU TP) and Tank 152 (EU TQ),
- Increase drumming of methyl methacrylate for resale, and
- Remove one existing tank, Tank 114 (EU TK).

**COMMENTS:**

- (1) Emission Units: The plant consists of natural gas and/or fuel oil fired boilers, bath reactors, tank farm, and powder processing operation as specified below:

(a) **BA - Boiler #1**

Description: Indirect Heat Exchanger – Cleaver Brooks Model CR100-300  
Fuel: Natural gas  
Construction Date: 1986  
Rated Capacity: 12.5 mmBtu/hr  
Control Equipment: None

(b) **BB - Hot Oil Heater**

Description: Indirect Heat Exchanger – MOOR Heat, Model HTL-10  
Fuel: Fuel Oils No. 1 and No. 2  
Construction Date: 1973  
Rated Capacity: 2.09 mmBtu/hr  
Control Equipment: None

(c) **BC - Boiler #2**

Description: Indirect Heat Exchanger – Cleaver Brooks Model CB11100-50  
Fuel: Fuel Oils No. 1 and No. 2  
Construction Date: 1973  
Rated Capacity: 1.4 mmBtu/hr  
Control Equipment: None

(d) **BD - Boiler #3**

Description: Indirect Heat Exchanger – Superior Steam Boiler  
Primary Fuel: Natural gas  
Backup Fuel: Fuel Oil No. 2  
Construction Date: 2001  
Rated Capacity: 21.0 mmBtu/hr  
Control Equipment: None

(e) Facility reactor systems consisting of the following:

Emission Point	Description	Reactor Installation Date	Reactor Capacity (Gallons)
R2	<b>Reactor System # 2*:</b> Batch production of polymers utilizing Reactor #2, Feed tank (pot 5), condenser, and two condensate receivers. No emission controls.	1989	1,900
R4	<b>Reactor System # 4*:</b> Batch production of polymers utilizing Reactor # 4, Feed tank (pot 5), condenser, and condensate receiver. No emission controls.	1993	600
R6	<b>Reactor System # 6*:</b> Batch production of polymers utilizing Reactor # 6, Feed tank (pot 5), condenser, and two condensate receivers. No emission controls.	1973	750
R8	<b>Reactor System # 8*:</b> Batch production of polymers utilizing Reactor # 8, two condensers, and condensate receiver. No emission controls.	1999	4,500
R11	<b>Reactor System # 11*:</b> Batch production of polymers utilizing Reactor # 11, two Feed tanks (A and B), condenser, two condensate receivers, and product receiver (pot 13). No emission controls.	1973	2,250
R12	<b>Reactor System # 12*:</b> Batch production of polymers utilizing Reactor # 12, two Feed tanks (A, pot 10), two condensers, condensate receiver, thin film evaporator, and chill roll. No emission controls.	2005	4,000
R16	<b>Reactor System # 16*:</b> Batch production of polymers utilizing Reactor # 16, two Feed tanks, condenser, condensate receiver, product receiver (pot 17), and receiver (tank 142). No emission controls.	1973	1,000
FUG	Fugitive emissions from associated piping for batch reactor systems consisting of the following: Valves – 238 (count) Pump Seals – 9 (count) Connectors (Flanges) – 373 (count) Relief Valves – 7 (count)	1973-2005	--

\*Some system equipment may be common with other reactor systems.

(f) Tank farm consisting of following storage tanks.

**DR** Monomer and Solvent Drumming – Loading from tanks to drums  
Construction Date: N/A  
Capacity: N/A  
Control Equipment: None

**TB** (Tank 104) Fixed roof volatile organic liquid storage vessel  
Construction Date: 1992  
Storage Capacity: 12,500 gallons  
Control Equipment: None

**TC** (Tank 118) Fixed roof volatile organic liquid storage vessel  
Construction Date: 1992  
Storage Capacity: 12,500 gallons  
Control Equipment: Vapor equalization back to tank wagon

**TL** (Tank 145) Fixed roof volatile organic liquid storage vessel  
Construction Date: 2003  
Storage Capacity: 3,000 gallons  
Control Equipment: Vapor equalization back to tank wagon

**TM** (Tank 146) Fixed roof volatile organic liquid storage vessel  
Construction Date: 2003  
Storage Capacity: 3,000 gallons  
Control Equipment: Vapor equalization back to tank wagon

**TN** (Tank 147) Fixed roof volatile organic liquid storage vessel  
Construction Date: 2003  
Storage Capacity: 8,000 gallons  
Control Equipment: Vapor equalization back to tank wagon

**TO** (Tank 148) Fixed roof volatile organic liquid storage vessel  
Construction Date: 2003  
Storage Capacity: 8,000 gallons  
Control Equipment: Vapor equalization back to tank wagon

**TP** (Tank 151) Vertical fixed roof volatile organic liquid storage vessel  
Construction Date: 2006  
Storage Capacity: 10,000 gallons  
Control Equipment: Vapor equalization back to tank wagon

**TQ** (Tank 152) Vertical fixed roof volatile organic liquid storage vessel  
Construction Date: 2006  
Storage Capacity: 10,000 gallons  
Control Equipment: Vapor equalization back to tank wagon

(g) Powder Processing consisting of following operations:

**BM** Boxing Machine  
Description: Construction Date: 2001  
Capacity: 6,000 lb/hr of polymer  
Control Equipment: Dust collector BH5  
Control Efficiency: 95%

<b>CG1</b>	Coarse Grinder # 1 – Cumberland grinder (grinder 2)
<u>Description:</u>	Construction Date: 1985 Capacity: 750 lb/hr Control Equipment: Dust collector BH3 Control Efficiency: 95%
<b>FB</b>	Sandvik flaker belt (grinder 5) Applicator end of the flaker belt Discharge end of the flaker belt
<u>Description:</u>	Construction Date: 1998 Capacity: 2,200 lb/hr flaked polymer Control Equipment: Dust collector BH6 and Dust collector BH2 Control Efficiency: 95% each
<b>LB</b>	Littleford blender (blender 2) Littleford Blender Packaging
<u>Description:</u>	Construction Date: 1985 Capacity: 750 lb/hr Control Equipment: Bag filters – vented indoors with negligible emissions; Dust collector BH3 Control Efficiency: 95%
<b>M1</b>	Mill – Custom fabrication (grinder 4)
<u>Description:</u>	Construction Date: 1998 Capacity: 1,500 lb/hr milled polymer Control Equipment: Dust collector BH2 Control Efficiency: 95%
<b>MM1</b>	Marion Mixer #1 Marion Mixer # 1 (blender 1) Packaging
<u>Description:</u>	Construction Date: 1992 Capacity: 1,250 lb/hr blended material (polymers, monomers) Control Equipment: Bag filters – vented indoors with negligible emissions and Dust collector BH1 Control Efficiency: 95%
<b>MM2</b>	Marion mixer (blender 3) Marion Mixer # 2 - vent 1 Marion Mixer #2 - vent 2
<u>Description:</u>	Construction Date: 1998 Capacity: 1,750 lb/hr blended material (polymers, monomers) Control Equipment: Dust collector BH4 and Dust collector BH5 Control Efficiency: 95%

<b>MP</b>	Micropulverizer (grinder 1) Micropulverizer Packaging
<u>Description:</u>	Construction Date: 1990 Capacity: 750 lb/hr pulverized polymers Control Equipment: Bag filter – vented indoors with negligible emissions; Dust collector BH3 Control Efficiency: 95%
<b>SSE</b>	Single Screw Extruder – Single screw extruder and drum flaker with chill rolls (masterbatch)
<u>Description:</u>	Construction Date: 2003 Capacity: 1,000 lb/hr polymers Control Equipment: None

- (2) Insignificant activities, as defined in 401 KAR 52:030, Section 6, at the plant are listed in Section C of the permit.
- (3) Emission Factors: AP-42, Chapter 1.4, Tables 1.4-1, -2 and -3 were used to determine the natural gas combustion emissions from Boilers #1 and #3. AP-42, Chapter 1.3, Tables 1.3-1, -2 and -3 were used to determine the #2 fuel combustion emissions from Boilers #1, #2, and Hot oil heater. Potential VOC emissions from the storage tanks were calculated using U.S. EPA TANKS4.09 program, with results provided by the permittee. Emissions from the Reactor Systems and Powder Processing operations were calculated based on mass balance provided by the permittee. Fugitive emissions were calculated using U.S. EPA SOCM1 Average emission factors taken from the November 1995 Protocol for Equipment Leak Emission Estimates. Twenty-five percent was added to the component counts to develop a total worst-case count for the source.
- (4) Existing Approvals: State Origin Permit No. S-97-086 was issued on September 10, 1997 pursuant to former regulation 401 KAR 50:031 (i.e., 50% rule). This permit limited Estron's emissions to less than ½ of the major source levels for criteria pollutants and hazardous air pollutants. Regulation 401 KAR 50:031 has been repealed and replaced by 401 KAR 52:080. This notwithstanding, the permittee has requested through this permitting action that permit S-97-086 be renewed as a Conditional Major permit pursuant to 401 KAR 52:080, Section 4(2). Therefore, the requirements of 401 KAR 52:080 no longer apply; instead, the requirements of 401 KAR 52:030 are applicable. In addition, the emission point IDs used in Permit S-97-086 have not been included in the conditional major permit. As indicated by the permittee during this review, these identifiers did not accurately reflect the emission points and units at the source and are therefore revised herein.
- (5) Applicable Regulations:
  - (a) 401 KAR 59:015, New Indirect Heat Exchangers  
Pursuant to 401 KAR 59:015, Section 1, the requirements of this rule apply to each indirect heat exchanger having a heat input capacity of more than one (1) million BTU per hour and that commenced on or after the applicable classification date

defined in Section 2 (3) of the rule. The maximum heat input capacity of each boiler (Boiler #1, #2, and #3) and hot oil heater is greater than the rule applicability threshold. Therefore, 401 KAR 59:015 is applicable to the aforementioned combustion units, and the allowable particulate and sulfur dioxide (SO<sub>2</sub>) emission limits are calculated as follows:

- (i) Pursuant to 401 KAR 59:015, Section 4(1)(c), the particulate emission rate for boilers # 1 and # 2 and the hot oil heater, having a total heat input capacity greater than 10 mmBtu/hr, shall be limited based on the following equation:

$$\begin{aligned}\text{PM emission rate} &= 0.9634 \times (\text{total heat input rating for the source})^{-0.2356} \\ \text{PM emission rate} &= 0.9634 \times (15.99)^{-0.2356} = 0.50 \text{ lb/mmBtu}\end{aligned}$$

*(These 3 units were installed during different years; however, the total heat input of these 3 units, determined in accordance with 401 KAR 50:015, Section 3(1), was used to determine the same allowable emission rate for each unit when they were permitted by this regulation in permit S-97-086.)*

For boiler # 3 (rated at 21.0 mmBtu/hr and constructed in 2001):

$$\begin{aligned}\text{PM emission rate} &= 0.9634 \times (\text{total heat input rating for the source})^{-0.2356} \\ \text{PM emission rate} &= 0.9634 \times (15.99+21)^{-0.2356} = 0.41 \text{ lb/mmBtu}\end{aligned}$$

- (ii) Pursuant to 401 KAR 59:015, Section 5(1)(c), the SO<sub>2</sub> emission rate for boilers # 1 and # 2 and the hot oil heater, having a total heat input capacity greater than 10 mmBtu/hr, shall be limited based on the following equation:

$$\begin{aligned}\text{SO}_2 \text{ emission rate} &= 7.7223 \times (\text{total heat input rating for the source})^{-0.4106} \\ \text{SO}_2 \text{ emission rate} &= 7.7223 \times (15.99)^{-0.4106} = 2.47 \text{ lb/mmBtu}\end{aligned}$$

For Boiler # 3 (rated at 21.0 mmBtu/hr and constructed in 2001):

$$\text{SO}_2 \text{ emission rate} = 7.7223 \times (15.99+21)^{-0.4106} = 1.75 \text{ lb/mmBtu}$$

- (iii) Pursuant to 401 KAR 59:015, Section 4(2), opacity of visible emissions from Boilers # 1, # 2, and # 3 and the hot oil heater each shall not exceed twenty (20) percent except a maximum of forty (40) percent opacity shall be permissible for not more than 6 consecutive minutes in any 60 consecutive minutes during cleaning the fire box or blowing soot.

- (b) The 401 KAR 60:005, which incorporates by reference federal regulation 40 CFR 60, Subpart Dc (40 CFR 60.40c), *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*) applies to Boiler No. 3 rated at 21.0 mmBtu per hour because the boiler was constructed after the rule applicability date of June 9, 1989 and the boiler is rated at less than one hundred (100) MMBtu, but greater than ten (10) MMBtu per hour. As such, the following shall apply:

- (1) The SO<sub>2</sub> emissions from the 21.0 MMBtu per hour boiler shall not exceed five tenths (0.5) pounds per million Btu heat input when burning fuel oil; or
- (2) The sulfur content of the fuel oil shall not exceed five-tenths percent (0.5%) by weight. [40 CFR 60.42c(d)]

The Permittee shall demonstrate compliance utilizing one of the following options:

- (1) Providing vendor analysis of fuel delivered, if accompanied by a certification; or
- (2) Analyzing the oil sample to determine the sulfur content of the oil via the procedures in 40 CFR 60, Appendix A, Method 19.

Boilers # 1 and # 2 are not subject to the requirements of Subpart Dc because the Boiler # 1 commenced operation before the rule applicability date of June 9, 1989 and the Boiler # 2 maximum heat input rating is less than the rule applicability threshold of 10 mmBtu/hr.

- (c) The 401 KAR 60:005, which incorporates by reference federal regulation 40 CFR 60, Subpart Kb (40 CFR 60.112b), *Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984* does not apply to any of the storage tanks (Tank 104, 114, 118, 145, 146, 147 and 148; T115, T140, T143, T144, T149 and T150 listed as insignificant activities) since the storage capacity of each tank is less than the rule applicability threshold of 75 m<sup>3</sup> (19,812 gallons). Storage tanks identified as 104 and 118 were listed in State Origin Permit (S-97-086) as being subject to Subpart Kb. Due to the October 15, 2003 rule revision which exempts storage tanks with capacities less than 75 cubic meters from the rule requirements, these tanks are no longer subject to Subpart Kb.
- (d) 401 KAR 59:050, *New Storage Vessels for Petroleum Liquids*  
This rule applies to each storage vessel for petroleum liquids with a storage capacity less than or equal to 151,400 liters (40,000 gallons) that commenced on and after the classification date of April 9, 1972 and before July 24, 1984, and to vessels with a storage capacity less than 40,000 liters (10,567 gallons) that commenced on or after July 24, 1984, when any such vessel is located in either an ozone nonattainment county or located at any other county at a major source of VOC. This rule also applies to vessels with a storage capacity greater than 40,000 gallons that commenced on or after the classification date of April 9, 1972 and prior to July 24, 1984.

Each storage tank at the facility including Tank 104, 118, 114, 145, 146, 147 and 148; T140, T143, T115, T144, T149 and T150 listed as insignificant activities, has the storage capacity less than the rule applicability threshold of 40,000 gallons, and the source is neither a major source nor located in a nonattainment county, therefore, this rule does not apply to any of the storage tanks at the source.



(e) 401 KAR 61:050, *Existing Storage Vessels for Petroleum Liquids*

This rule applies to each storage vessel for petroleum liquids with a storage capacity of greater than 2,195 liters (580 gallons) that commenced before the classification date of April 9, 1972, and which is located in a county or portion of a county designated ozone nonattainment under 401 KAR 51:101, except marginal nonattainment.

This source is not subject to this rule because it is located in Marshall County which is designated as attainment for ozone.

(f) 401 KAR 63:020, *Potentially Hazardous Matter or Toxic Substances*

The Reactor Systems are subject to the 401 KAR 63:020. This rule requires that persons responsible for a source from which hazardous matter or toxic substances may be emitted shall provide the utmost care and consideration, in the handling of these materials, to the potentially harmful effects of the emissions resulting from such activities. No owner or operator shall allow any affected facility to emit potentially hazardous matter or toxic substances in such quantities or duration as to be harmful to the health and welfare of humans, animals and plants.

(g) 401 KAR 59:010, *New Process Operations*

Pursuant to 401 KAR 59:010, Section 1, the requirements of this rule apply to each affected facility, associated with a process operation, which is not subject to another emission standard with respect to particulates in 401 KAR Chapter 59, commenced on or after July 2, 1975. The requirements of this rule are included in the permit for the following emission units:

1. Boxing Machine (EP BM)
2. Coarse Grinder # 1 (EP CG1)
3. Flaker Belt (EP FB)
4. Littleford Blender (EP LB)
5. Mill (EP M1)
6. Marion Mixer #1 (EP MM1)
7. Marion Mixer #2 (EP MM2)
8. Micropulverizer (EP MP)
9. Single Screw Extruder (EP SSE)

Pursuant to 401 KAR 59:010, Section 3(1)(a), no person shall cause, suffer, allow, or permit any continuous emission into the open air from a control device or stack associated with any affected facility which is equal to or greater than twenty (20) percent opacity.

Mass Emission Limit pursuant to 401 KAR 59:010 Section 3(2): For process rates greater than or equal to 1,000 lbs/hr but less than 60,000 lbs/hr, the allowable emissions of particulate matter shall not exceed :  $3.59 \times (\text{Tons Processed})^{0.62}$  lbs/hr. For processing rates of 1000 lbs/hr or less, the allowable emission rate is 2.34 lbs/hr.

(6) Non-Applicable Regulations:

- (a) Estron has requested voluntary permit emission limits of 90 tons per year (tpy) or less of VOC, 9 tpy or less of a single hazardous air pollutant (HAP), and 22.5 tpy or less of combined HAPs. As such, this source will not be a major source of HAP emissions, and there are no *NESHAPs* (40 CFR 63 and 401 KAR 63) applicable to this area source for HAP emissions, as such is defined at 40 CFR 63.2. Compliance with above emission limits shall also make the requirements of 401 KAR 52:020, *Title V permits*, and 401 KAR 50:031 (now replaced with 401 KAR 52:080), not applicable to the source.
- (b) 401 KAR 61:175, *Leaks from existing synthetic organic chemical and polymer manufacturing equipment* does not apply to this source since the products manufactured do not meet the definitions of synthetic organic chemical manufacturing plant or polymer manufacturing plant, pursuant to 401 KAR 61:175, Section 1.
- (c) 40 CFR 60, Subpart VV, *Standards of Performance for Equipment Leaks of VOC in Synthetic Organic Manufacturing Industry* (incorporated by reference at 401 KAR 60:005) does not apply because the facility is not a synthetic organic chemicals manufacturing industry as defined (i.e., does not produce as a product, intermediate, or byproduct, any of the chemicals listed in 40 CFR 60.489). [40 CFR 60.481]
- (d) 40 CFR 60, Subpart DDD, *Standards of Performance for Volatile Organic Compound Emissions from the Polymer Manufacturing Industry* (incorporated by reference at 401 KAR 60:005) does not apply because the facility does not manufacture polypropylene, polyethylene, polystyrene, or poly (ethylene terephthalate). [40 CFR 60.560(a)]
- (e) 40 CFR 60, Subpart RRR, *Standards of Performance for Volatile Organic Compound Emissions from Synthetic Organic Chemical Manufacturing Industry Reactor Processes* (incorporated by reference at 401 KAR 60:005) does not apply because each reactor process is designed and operated as a batch operation. [40 CFR 60.700(c)(1)]
- (f) 40 CFR 64, *Compliance Assurance Monitoring (CAM)*, does not apply to any emission unit because this source is being approved to operate under a Conditional Major permit and, pursuant to 40 CFR 64.2(a), the requirements of this rule are applicable only to a source required to obtain a Title V (Part 70 or 71) permit.

**EMISSION AND OPERATING CAPS DESCRIPTION:**

Marshall County is designated as attainment for all criteria pollutants. To preclude the applicability of 401 KAR 52:020, Title V permits, as defined in 401 KAR 52:001, Definitions, source-wide emissions shall not equal or exceed the following limits on any monthly rolling 12-month total basis:

- a. Volatile organic compound (VOC) emissions: 90 tons per year; and
- b. Particulate matter less than 10 microns (PM10) emissions: 90 tons per year.

The permittee has also requested the following limits:

- c. Total hazardous air pollutant (HAP) emissions: 22.5 tons per year; and
- d. Single HAP emissions: 9 tons per year.

Compliance with these limits shall also make the requirements of 401 KAR 51:017, *Prevention of Significant Deterioration of Air quality*, and 40 CFR Part 63 for major sources of HAP emissions, as incorporated by reference at 401 KAR 63:002, not applicable to this source.

**PERIODIC MONITORING:**

Controls are exclusively for PM/PM10, and they consist of a dry filter to control particulate emissions from the paint booth. The particulate control efficiency for the control equipment is estimated to be 95%. Monitoring of the dust collector stacks shall consist of monthly visible emissions notations of the stack and quarterly dust collector inspections.

To demonstrate compliance with the source-wide VOC and HAP emissions limits, the permittee shall calculate and keep records of VOC and HAP emissions as specified in Section D of the permit.

**OPERATIONAL FLEXIBILITY:**

None

**CREDIBLE EVIDENCE:**

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has only adopted the provisions of 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12 into its air quality regulations.